Depression, anxiety, and stress of emergency medical technicians in the third year of the COVID-19 pandemic: A cross-sectional study in Zanjan, Iran

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Abstract

Background and aims: Emergency medical technicians (EMTs) are healthcare professionals caring for COVID-19 patients. The prolonged pandemic may lead to fatigue and threaten caregivers' mental health. Therefore, this study aims to investigate the level of stress, depression, and anxiety among EMTs in Zanjan during the third year of the COVID-19 outbreak.

Methods: This cross-sectional study was conducted on 194 EMTs from Zanjan University of Medical Sciences, Iran, between June 2021 and September 2021. participants were selected using random cluster sampling. Data collection involved using a demographic questionnaire and Depression, Anxiety and Stress Scale-21 Items (DASS-21). Data were analyzed using SPSS version 24.

Results: All participants in the study were male, with a mean age of 33.46 ± 7.25. The mean and standard deviation of depression, anxiety, and stress were 3.12 ± 3.03, 2.24 ± 2.38, and 4.16 ± 3.27, respectively. A significant association was found between the mean score of anxiety and the number of missions and between the mean score of stress and the number of tasks, age, and work experience ($P < 0.05$).

Conclusion: The level of depression, anxiety, and stress among EMTs was within the normal range. The prolonged pandemic may have helped EMTs adapt to this critical situation. However, it is essential to note that this study was conducted on a limited group of EMTs, and socio-cultural contexts influence psychological characteristics. Therefore, further research in this field is necessary in the future.

Keywords: Stress, Anxiety, Depression, Emergency medical technicians, COVID-19

Introduction

The COVID-19 pandemic has profoundly affected various aspects of life worldwide (1). In the face of this unprecedented crisis, healthcare workers (HCWs) who diagnose, treat, and care for COVID-19 sufferers are at risk of developing mental disorders. Suspected illness, high workload, reduced personal protective equipment, lack of specific medications, extensive media coverage, and lack of support may lead to stress in HCWs (2). Previous studies have shown severe psychological reactions in HCWs during the SARS virus outbreak in 2003 (3,4).

Because emergency medical services, as part of a multidisciplinary healthcare team, are involved in managing public health emergencies, such as infectious disease epidemics, unique challenges are expected under these conditions beyond what typically occurs. Emergency medical technicians (EMTs) are particularly at risk of infection due to working in uncontrolled conditions, having limited information regarding their patients, providing care in the confined space of an ambulance, and having inadequate ventilation (5). Pre-hospital emergency services have played an undeniable role in the COVID-19 pandemic. Since the beginning of the pandemic, there has been a high demand for EMTs as the frontline in managing COVID-19 patients (6). During the COVID-19 pandemic, EMTs are affected by physical and psychological consequences such as anxiety, depression, insomnia, and practical obsession due to the increased workload of the medical emergency system and repeated contact with patients presenting fever and respiratory symptoms (7).

As mentioned, one of the psychological complications experienced by EMTs during the COVID-19 outbreak is depression. Depression is a disorder that causes individuals to lose interest in life and generally impairs their individual and social functioning (8). Depression among medical staff due to job stress results in increased treatment costs, loss of working hours, and decreased productivity. Another complication that is becoming a problem is absenteeism (9). .In the study of Srikanth et al.

in Washington, a high depression score was reported in 35% of 123 EMTs under investigation. (10).

Anxiety is also a prevalent mental health issue among HCWs in the severe condition of COVID-19. One of the reasons for this is the fear of transmitting the virus to their families (11). The threatening, anonymous, and rapidly evolving nature of COVID-19 can lead to severe anxiety among individuals, including HCWs (12). The mental and physical health, anxiety, and stress levels HCWs and emergency medical workers are determining factors in reducing the quality and quantity of their work efficiency. They are associated with the quality and quantity of their work efficiency and are related to the quality of patient care. Over time, the resulting stress can lead to physical and mental problems (13).

Exposure to acute and chronic stressors harms the safety and health of EMTs. If these stresses are not managed successfully, they adversely affect patient care (14). Additionally, anxiety and stress weaken the immune system and make individuals more susceptible to coronary heart disease (15). A systematic review and meta-analysis conducted by Al Maqbali et al found that approximately one-third of the nurses working during the COVID-19 pandemic suffer from psychological symptoms (16). A review study conducted in Iran also mentioned depression, anxiety, and stress as psychological consequences of COVID-19 in HCWs (17).

Unlike controlled patient care in a hospital setting, pre-hospital staff may intervene with limited information and care for patients in an ambulance enclosure with inadequate ventilation, including those whose COVID-19 has not yet been diagnosed. Due to rapid medical decisions and care for patients. This can lead to severe physical and psychological stress. Therefore, employees' mental and physical health directly relates to their performance in caring for patients, enhancing satisfaction and interest in work and improving efficiency. The research team did not find a study on depression, anxiety, and stress of EMTs during the COVID-19 pandemic in Iran. Therefore, considering the prevalence of mental health issues in HCWs during previous experiences with emerging diseases such as SARS and MERS, as well as our limited knowledge about the mental health of EMTs during the COVID-19 pandemic, it seems necessary to conduct this study. Additionally, due to the prolonged COVID-19 pandemic as a crisis, this cross-sectional study can provide the basis for more conscious and accurate care, management, and protection plans for the multidisciplinary healthcare team. Therefore, this study aimed to investigate depression, anxiety, and stress in the EMTs of Zanjan University of Medical Sciences, Zanjan, Iran, in the third year of the COVID-19 pandemic.

Methods
Study design
This cross-sectional study was conducted on 194 EMTs working in 8 cities of Zanjan, Iran, from June 2021 to September 2021.

Participants
The study population included all EMTs working in Zanjan province.

Inclusion criteria were: technicians working in one of the primary, intermediate, and senior categories of medical emergencies and technicians working in the headquarters and communications center if employed in pre-hospital emergency services during the COVID-19 pandemic. The total number of EMTs employed in Zanjan province during the study period was 405. The sample size was calculated with $\alpha = 0.05$, power = 80, Z = 1.96, and $\beta = 0.2$, resulting in a sample size of 194 technicians.

The cluster random sampling method was used. Firstly, we obtained information about the total number of urban and road emergency stations and the number of technicians in each station. Then, we received the name list of eligible technicians at each emergency station. Next, we calculated the share of each emergency station based on the number of personnel employed. Finally, sampling was completed among the eligible technicians based on the table of random numbers.

Procedure
We obtained the necessary permissions from Zanjan University of Medical Sciences administrators to gather information. Arrangements were made with the head of the Medical Emergency and Accident Management Center and the emergency officials of Zanjan province, Iran. The researcher (first author) visited the emergency stations for sampling and explained the research purposes to the participants. The questionnaires were distributed and completed by the participants, and the researcher revisited the stations two days later to collect the answered questionnaires.

Data collection method
A demographic information questionnaire and the Depression, Anxiety and Stress Scale-21 Items (DASS-21).

Demographic information questionnaire
This questionnaire assessed age, type of employment, work experience in the emergency department, marital status, education, number of missions, weekly working hours, and road and urban emergency stations. Ten Zanjan University of Medical Sciences faculty members reviewed and confirmed the content validity of this questionnaire.

Depression, Anxiety, and Stress Questionnaire - DASS-21
The DASS-21 questionnaire was introduced by Lovibond in 1995 and consisted of three subscales (Depression, Stress, and Anxiety) with seven items. This questionnaire contains 21 items on a Likert scale with four choices ranging from zero (did not apply to me at all) to three (Applied to me very much). Items 3, 5, 10, 13, 16, 17, and 21 assess depression; items 2, 4, 7, 9, 15, 19, and 20

assess anxiety; and items 1, 6, 8, 11, 12, 14, and 18 assess stress. The total score for each subscale is the sum of the scores of the corresponding items. Higher scores indicate a higher degree of disorder. The severity of normal stress disorder is classified as 0-7 (normal), 8-9 (mild), 10-12 (moderate), 13-16 (severe), and >17 (very severe). The classification for normal anxiety disorder is 0-3 (normal), 4-5 (mild), 6-7 (moderate), 8-9 (severe), and >10 (very severe). For depressive disorder, the classification is 0-4 (normal), 5-6 (mild), 7-10(moderate), 11-13 (severe), and >14 (very severe). The Persian version of this scale has demonstrated satisfactory validity and reliability in the Iranian population (18). The questionnaire reliability was assessed using internal consistency with a Cronbach's alpha coefficient of $\alpha = 0.89$.

Data analysis
The collected data was analyzed using the SPSS statistical software version 24 (SPSS Inc., Chicago, Illinois, USA), and analytical and descriptive statistical methods were applied. The normal distribution of quantitative data was assessed using the Kolmogorov-Smirnov test, which indicated that the distribution of depression, anxiety, and stress scores was not normal ($P < 0.05$). Non-parametric tests, such as Kruskal-Wallis and Mann-Whitney tests, were used to compare the mean of demographic variables with each studied variable. Spearman correlation coefficient was used to investigate the relationship between depression, anxiety, and stress with demographic variables. The significance level was set as less than 0.05.

Results
Demographic information of the participants
The participants had a mean age of 33.46 ± 7.25 years. Most of them (72.2%) were married, had provisional employment status (43.8%), worked in road emergency stations (62.4%), and had less than ten years of experience (8.49 ± 5.33). Most participants had an associate degree (59.3%) and studied medical emergency (88.7%). The mean weekly work hours for the EMTs were 58.55 ± 11.41 hours, and they had an average of 4.30 ± 2.91.

Depression, anxiety, and stress
The statistical test results showed that the mean and standard deviation for depression, anxiety, and stress among the EMTs were 3.12 ± 3.03, 2.24 ± 2.38, and 4.16 ± 3.27, respectively. The level of depression among the EMTs was classified as 95.4% normal, the level of anxiety among the staff was 95.4% normal, and the level of stress among the staff was 99.5% normal. The frequency distribution of depression, anxiety, and stress levels in the studied EMTs is provided in Table 1.

Relationship between depression, anxiety, and stress with demographic information
There was no significant association between the mean score of depression and demographic characteristics

Table 1. Frequency (percentage) of level of depression, anxiety, and stress symptoms among EMTs

Level	Depression No. (%)	Anxiety No. (%)	Stress No. (%)
Normal	185 (95.4)	185 (95.4)	193 (99.5)
Mild	7 (3.6)	6 (3.1)	1 (0.5)
Moderate	2 (1)	3 (1.5)	0 (0)

($P > 0.05$). However, there was a significant association between the mean score of anxiety and mission ($P = 0.032$). The mean stress score, age, work experience, and mission were significantly associated ($P < 0.05$). Further information regarding comparing depression, anxiety, and stress scores based on demographic characteristics can be found in Table 2.

Discussion
We evaluated the level of depression, stress, and anxiety among EMTs from Zanjan University of Medical Sciences, Zanjan, Iran, during the third year of the COVID-19 pandemic. The level of depression, anxiety (95.4%), and stress (99.5%) among EMTs was within the normal range. A study conducted by Hosseinzadeh-Shanjani et al at Vali-e-Asr hospital in Zanjan, which examined the level of depression, stress, and anxiety among HCWs, also reported normal levels of stress, depression, and anxiety (19), which is consistent with the finding of our study.

Lai et al assessed physicians and hospital nurses in Wuhan, China, during the outbreak of COVID-19 and found a high level of anxiety (44.6%) and depressive symptoms (50.4%) among HCWs (2). Usul et al investigated the impact of the COVID-19 pandemic on anxiety levels among EMTs in Ankara, Turkey. Also, they reported a high prevalence of anxiety among medical personnel during the COVID-19 pandemic (20). Pouralizadeh et al studied depression and anxiety, along with their associated factors, among nurses from Guilan University of Medical Sciences during the COVID-19 epidemic. This study indicated that the mean prevalence of anxiety and depression was 38.8% and 37.4%, respectively (21), which differs from our research findings.

To explain the inconsistency between the studies above and our study, it can be noted that on February 9, 2021, the Ministry of Health of Iran initiated the COVID-19 vaccination program, and priority was given to HCWs. It is understood that vaccination provides HCWs with a sense of protection and thus improves their mental health (22). Additionally, the decrease in the frequency of COVID-19 cases during the third year of the epidemic compared to the earlier years (23), along with a decline in the number of missions in the pre-hospital emergency setting, maybe another influential factor contributing to the normal level of mental health among medical staff.

Also, the studies above differed from the present study in terms of the study population. Most participants in those studies were women, and gender was found to have significant results. Considering that women are typically more psychologically vulnerable to stress (24), they may

Table 2. Comparison of the mean±SD scores of stress, anxiety, and depression based on EMTs characteristics

Variables		Depression Mean±SD	Sig. statistics	Anxiety Mean±SD	Sig. statistics	Stress Mean±SD	Sig. statistics
Employment status	Permanent	3.58±3.36	0.413* F=3.94	2.79±2.63	0.361* F=4.34	4.88±2.9	0.179* F=6.28
	Sub-permanent	2.36±2.25		1.5±1.59		3.27±2.74	
	Contractual	3.62±4.89		2.34±2.71		4.28±3.48	
	Mandatory	4±4.89		2.33±1.73		4.77±4.76	
	Provisional	2.78±2.80		2.11±2.31		3.91±3.30	
Marital status	Single	3.61±3.86	0.643** T=3619.5	2.20±2.56	0.564** T=3582	3.83±3.98	0.062** T=3128.5
	Married	2.93±2.63		2.26±2.31		4.29±2.96	
Educational level	Associate Degree	2.86±2.96	0.152* F=2.05	2.02±2.31	0.084* F=2.97	3.89±3.55	0.05* F=3.84
	Bachelor	3.45±3.11		2.5±2.32		4.44±2.80	
	Master	4±3.39		3.6±4.27		6.2±2.58	
Workplace	Road stations	3.23±3.08	0.524** T=4177.5	2.44±2.58	0.306** T=4036	4.22±3.28	0.685** 4263.5
	Urban station	2.94±2.94		1.91±1.97		4.06±3.28	
		r	Sig	r	Sig	r	Sig
Age		0.047	0.514***	0.05	0.491***	0.208	0.004***
Work experience		0.094	0.191***	0.049	0.496***	0.212	0.003***
Mission number		- 0.079	0.272***	-0.154	0.032***	-0.151	0.035***

Abbreviations: SD; standard deviation. Sig; statistical significance. r; correlation coefficient.
* Kruskal-Wallis; ** Mann-Whitney; *** Spearman correlation coefficient.

have experienced higher levels of depression, anxiety, and stress during the COVID-19 pandemic than the male EMTs in Zanjan.

We found no significant association between the mean depression score and demographic characteristics. However, Ariapooran and Amirimanesh investigated anxiety, depression, and suicidal ideation among nurses during the COVID-19 outbreak in three hospitals in Malayer. They reported that female nurses were more anxious and depressed than their men counterparts (24), contrasting our study findings. The discrepancy between this study and our study may be attributed to differences in the study population and the gender of the participants.

The results showed of our study indicated that employees with a higher number of missions. This is consistent with a survey by Dadashzadeh et al in East Azerbaijan province, which showed that anxiety increased with an increased number of missions (25). Mental health problems can negatively impact the decision-making abilities of HCWs, including EMTs. Therefore, addressing mental health concerns is crucial for preventing and controlling the disease pandemic. Improving the mental health of HCWs relies on determining and defining the maximum working hours and work shifts schedules, emphasizing self-care practices, and reducing excessive workload. Additionally, healthcare providers must enhance their knowledge of infection control and self-protection (26).

Findings revealed that individuals with higher work experience and a more significant number of missions experienced higher stress levels than their younger and less experienced colleagues, which is consistent with the results of the study by Dadashzadeh et al (25). A study by Bentley et al on American EMTs also supported our findings, as they found that individuals with over 16 years

of work experience reported higher stress levels (27). Additionally, the study by Moshtagh Eshgh et al aligns with our results (28).

Hosseinzadeh-Shanjani et al examined the levels of anxiety, depression, and stress among HCWs of Vali-e-Asr hospital in Zanjan (19), while the study of Sarboozi Hoseinabadi et al aimed to investigate depression, stress, and anxiety during the COVID-19 pandemic at Torbat Heydariyeh hospital. Their study showed that stress level decreases with age (29), which contradicts our findings. The difference in sample size, culture, individual and social factors, geographical location, and types of emergency missions may contribute to the disparities between the results of these studies and our present study.

The results of this study have important implications for addressing the mental health of emergency medical workers during the COVID-19 pandemic. Our findings can inform policymakers and prehospital emergency managers in designing and implementing preventive interventions and appropriate screening for emergency medical workers at risk of mental health issues during emerging crises. By doing so, the detrimental consequences of anxiety, depression, and stress on EMTs' physical and psychological well-being can be mitigated. Furthermore, our study serves as a basis for comparing the results of studies conducted at the onset of the pandemic and in the post-corona era.

Limitations of the study

The first limitation of this study is that its cross-sectional design prevents the establishment of causality based on its findings. Secondly, cluster sampling may only partially represent part of the study population. Third, due to the nature of the variable being investigated, participants may

have provided socially desirable responses, which should be considered when generalizing the findings. Further studies using alternative approaches, such as qualitative research, should be conducted.

Conclusion

In conclusion, based on the results of the present study, the level of depression, anxiety, and stress among EMTs was found to be in the normal range. The prolonged duration of the pandemic may have contributed to the EMT›s ability to cope with this critical situation. Additionally, the decrease in the frequency of COVID-19 patients and related missions in the third year of the pre-hospital emergency pandemic could influence the average level of depression and anxiety stress among EMTs. However, it is essential to note that our study was conducted on a limited group of EMTs, and sociocultural contexts influence psychological characteristics. Therefore, further studies in this field are necessary.

Authors' Contribution
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Competing Interests
The authors declared no conflict of interest.

Ethical Approval
This research was approved by the Research Council and the Biomedical Research Ethics Committee of Zanjan University of Medical Sciences (Code: IR.ZUMS.REC.1400.082). Before data collection, participants were informed about the study and its objectives and assured that their data would be confidential. After obtaining the participants' consent to participate in the study, written informed consent was obtained from them.

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